		ATTORNEY'S DOCKET NUMBER
RM PTO-1390 (REV. 1-98)	U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	3286-0111P
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/701184
NTERNATIONAL APPLICATION NO. PCT/DE 99/01542	INTERNATIONAL FILING DATE May 26, 1999	PRIORITY DATE CLAIMED May 27, 1998

TITLE OF INVENTION

METHOD AND CIRCUIT ARRANGEMENT FOR RESTORING A BINARY SIGNAL
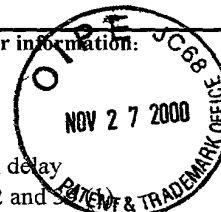
APPLICANT(S) FOR DO/EO/US

BOZENHARDT, Johannes

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

NOV 27 2000

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(a).

4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))

    a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☒ has been transmitted by the International Bureau. WO 99/62200

    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(3)).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).

    a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☐ have been transmitted by the International Bureau.

    c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.

    d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98./International Search Report with cited references

12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☒ Other items or information:
PCT/ISA/210
Two (2) sheets of formal drawings
German Search Report

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
09/701184 NEW	PCT/DE99/01542	3286-0111P

17. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):

		CALCULATIONS	PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.	$1,000.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$860.00		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.	$710.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	$690.00		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4).	$100.00	$ 860.00	

ENTER APPROPRIATE BASIC FEE AMOUNT =

	CALCULATIONS	PTO USE ONLY
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 0	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	8 - 20 =	0	X $18.00	$ 0	
Independent Claims	1 - 3 =	0	X $80.00	$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)	NO		+ $270.00	$ 0	
		TOTAL OF ABOVE CALCULATIONS =		$ 860.00	
Reduction of ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				$ 0	
			SUBTOTAL =	$ 860.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐20 ☐30 months from the earliest claimed priority date (37 CFR 1.492(f)).			+	$ 0	
		TOTAL NATIONAL FEE =		$ 860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property			+	$ 40.00	
		TOTAL FEES ENCLOSED =		$ 900.00	
			Amount to be: refunded	$	
			charged	$	

a. ☒ A check in the amount of $ **900.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account. No. _____ in the amount of $_____ to cover the above fees.
   A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **02-2448**.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Send all correspondence to:
Birch, Stewart, Kolasch & Birch, LLP or **Customer No. 2292**
P.O. Box 747
Falls Church, VA 22040-0747
(703)205-8000

SIGNATURE

DALEY, DONALD J.
NAME

#34,313 (DJD)
REGISTRATION NO.

/rem November 27, 2000

(REV. 09/29/2000)

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Johannes BOZENHARDT

International
Application No.:   PCT/DE99/01542

Application No.:   **NEW**

Filed: November 27, 2000

For: METHOD AND CIRCUIT FOR RESTORING A BINARY SIGNAL

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents   November 27, 2000
Washington, DC 20231

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

IN THE ABSTRACT

Please replace the Abstract with the attached revised Abstract.

IN THE SPECIFICATION

Please amend the specification as follows:

Page 1

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/DE99/01542 which has an International filing date of May 26, 1999, which designated the United States of America.--

Page 1

Line 1,   delete "Description";

Line 5,   insert the following title:

--<u>FIELD OF THE INVENTION</u>--;

In between lines 10 and 11 insert the following title,

--<u>BACKGROUND OF THE INVENTION</u>--

Page 2

Before line 1, insert the following title:

--<u>SUMMARY OF THE INVENTION</u>--;

Line 1,   after "of" insert --a--;

Line 4,   change "must be" to --is--;

Line 31,   after "which" insert --,--; after "case" insert --,--; and

Line 32,   change "comprise" to --include--.

Page 3

Line 20,   after "at" insert --,--; after "case" insert --,--;

Line 25,   change "interval," to --interval.--; and

Line 29,   after "of" insert --,--; after "case" insert --,--.

Page 4

After Line 13, insert the following paragraph:

--Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the

invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.--;

In between lines 13 and 14 insert the following title:

--BRIEF DESCRIPTION OF THE DRAWINGS--;

Line 16,   change "drawing" to --drawings--;

Line 18,   after "which" insert --:--;

Line 19,   change "figures" to --Figures--; change "show" to --are--;

In between lines 21 and 22 insert the following heading:

--DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS--;

Line 22,   after "figure 1," insert --element--;

Line 29,   after "which" insert --,--; change "case comprise" to --case, include--;

Line 33,   change "10," to --10.--; and

Line 34,   change "which" to --This--; change "comprises" to --includes--.

Page 5

Line 27,   after "4" insert --,--.

Page 6

After line 17, insert the following new paragraph:

--The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one

skilled in the art are intended to be included within the scope of the following claims.--

IN THE CLAIMS

Please amend the claims as follows:

1.   (Amended) A method for restoring a binary signal [(4, 8)], which can be transmitted via an optical transmission link exhibiting a distortion time, from a distorted binary signal [(1, 5), the optical transmission link exhibiting a distortion time, characterized by the following method steps] comprising:

[-]   determining time intervals [(Z1, Z2, ...) which in], each [case] including [comprise] at least twice the distortion time, [the] a clock rate of the binary signal [(4, 8) comprising] including an integral multiple of one time interval [(Z1, Z2, ...),];

[-]   detecting an occurrence of level changes of the distorted binary signal [(1, 5)] in the time intervals [(Z1, Z2, ...),];

[-]   determining level holding times [(Ph11, Ph21, Ph22, ...)] of the distorted binary signal [(1, 5) which in each case indicate how long] indicating an amount of time that a level remains unchanged within a time interval [(Z1, Z2, ...),]; and

[-]   restoring the binary signal [(4, 8)] in the time intervals [(Z1, Z2, ...)],

[-]   by transferring [the detected] a level of the distorted binary signal in the time intervals [(Z1, Z2, ...)] in which no level changes have [taken place] occurred in the distorted binary signal [(1, 5)], and

[-]   by transferring [the detected] a level of the distorted binary signal in the time intervals [(Z1, Z2, ...)] in which level changes have [taken place] occurred, only

-4-

when the respective level holding times [(Ph11, Ph21, Ph22, ...)] reach a predeterminable value.

2.   (Amended) The method as claimed in claim 1, [characterized in that the] wherein a type of distortion ["elongated or shortened Low or High pulse"], which can be determined in an identification mode of operation, is taken into consideration for weighting the level holding times [(Ph11, Ph21, Ph22, ...)], for restoring the binary signal [(4, 8)] in the time intervals [(Z1, Z2, ...)] in which level changes [took place] have occurred.

3.   (Amended) The method as claimed in claim 1 [or 2], [characterized in that] wherein, after each level change, the subsequent time intervals [(Z1, Z2, ...)] are synchronized.

4.   (Amended) A circuit arrangement for [carrying out the method as claimed in claim 1] restoring a binary signal, which can be transmitted via an optical transmission link exhibiting a distortion time, from a distorted binary signal, comprising [characterized by]:

[-]   means for determining time intervals [(Z1, Z2, ...) which in], each [case comprise] including at least twice the distortion time, [the] a clock rate of the binary signal [(4, 8) comprising] including an integral multiple of one time interval [(Z1, Z2, ...),];

[-]   means for detecting an occurrence of level changes of the distorted binary signal [(1, 5)] in the time intervals [(Z1, Z2, ...),];

[-]   means for determining level holding times [(Ph11, Ph21, Ph22, ...)] of the distorted binary signal [(1, 5) which in each case indicate how long] indicating an

amount of time that a level remains unchanged within a time interval [(Z1, Z2, ...),]; and

[-] means for restoring the binary signal [(4, 8)] in the time intervals [(Z1, Z2, ...)]

[-] by transferring [the detected] a level of the distorted binary signal in the time intervals [(Z1, Z2, ...)] in which no level changes have [taken place] occurred in the distorted binary signal [(1, 5)], and

[-] by transferring [the detected] a level of the distorted binary signal in the time intervals [(Z1, Z2, ...)] in which level changes have [taken place] occurred, only when the respective level holding times [(Ph11, Ph21, Ph22, ...)] reach a predeterminable value.

5.   (Amended) The circuit arrangement as claimed in claim 4, [characterized in that] further comprising:

first means [are provided which take] for taking a type of distortion into consideration [the type of distortion "elongated or shortened Low or High pulse"], which is determined by the first means in an identification mode of operation, for weighting the level holding times [(Ph11, Ph21, Ph22, ...)], for restoring the binary signal [(4, 8)] in the time intervals [(Z1, Z2, ...)] in which level changes [took place] have occurred.

6.   (Amended) The circuit arrangement as claimed in claim 4 [or 5], [characterized in that] further comprising:

means [are provided which] for, after each level change, [synchronize] synchronizing the subsequent time intervals [(Z1, Z2, ...)].

- 6 -

Please add the following new claims:

-- 7.   The method as claimed in claim 2, wherein, after each level change, the subsequent time intervals are synchronized.

8.   The circuit arrangement as claimed in claim 5, further comprising:

means for, after each level change, synchronizing the subsequent time intervals. --

REMARKS

Claims 1-8 are now present in this application, with new claims 7 and 8 being added by the present Preliminary Amendment.

Changes made in the Preliminary Amendment have been made to correct minor informalities and to place the application, including the claims, in better form for U.S. practice. No changes in the claims have been made to avoid prior art.

Accordingly, an early indication of the allowability of each of claims 1-8 in connection with the present application is earnestly solicited.

The specification has been amended to provide a cross-reference to the previously filed International Application.
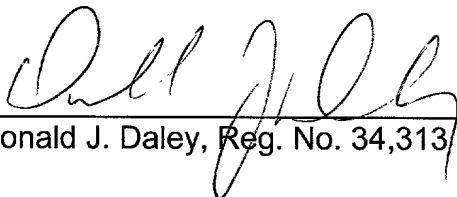
CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Donald J. Daley at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By: _____

Donald J. Daley, Reg. No. 34,313

P.O. Box 747

DJD:kna

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ABSTRACT OF THE DISCLOSURE

Subscribers in optical data transmission systems usually receive binary signals with a time distortion due to attenuations within the transmission link. A method and a circuit arrangement for restoring a binary signal from a distorted binary signal are proposed, in which the Baud rate of the binary signal does not need to be known exactly to the receiving subscriber of the optical data transmission system.

Description

Method and circuit arrangement for restoring a binary signal

5

The invention relates to a method and a circuit arrangement for restoring a binary signal, which can be transmitted via an optical transmission link, from a distorted binary signal, the optical transmission link

10   exhibiting a distortion time.

Repeaters in optical data transmission systems usually receive binary signals with a time distortion due to attenuations within the transmission link. This means that the distorted binary signals are either

15   over- or underdriven due to signal changes and the Low or High pulses are either elongated or shortened. These disturbances must be rectified by the repeater before it forwards the binary signal to another repeater or receiver.

20   The binary signal can be regenerated from a disturbed binary signal by, e.g. a starting edge of the disturbed binary signal triggering a sampling circuit which in each case samples the level of the binary signal at the midpoint of the bit. For this purpose,

25   however, it is necessary that the sampling circuit accurately knows the clock rate of the binary signal as a result of which the latter must be provided with an elaborate Baud rate detection circuit or with a Baud rate adjustment switch. In addition, the sampling of

30   the binary signal at the midpoint of the bit increases the signal transit times in extensive optical waveguide systems, especially in the case of binary signals with low Baud rates.

The present invention is based on the object of simplifying method of the type mentioned initially. In addition, a circuit arrangement for carrying out the method must be specified.

5   The object is achieved by the following method steps with regard to the method:

-      determining time intervals which in each case comprise at least twice the distortion time, the clock rate of the binary signal comprising an
10   integral multiple of one time interval,

-      detecting level changes of the distorted binary signal in the time intervals,

-      determining level holding times of the distorted binary signal which in each case indicate how long
15   a level remains unchanged within a time interval,

-      restoring the binary signal in the time intervals

   - by transferring the detected level in the time intervals in which no level changes have taken place in the distorted binary signal, and
20   - by transferring the detected level in the time intervals in which level changes have taken place, only when the respective level holding times reach a predeterminable value.

The object with regard to the circuit
25 arrangement is achieved by the measures specified in the characterizing clause of claim 4.

It is advantageous that, in order to restore the binary signal, its Baud rate does not need to be known exactly to the receiving subscriber of an optical
30 data transmission system. It is only necessary to set in the subscriber time intervals which in each case comprise at least twice the

distortion time. This distortion time can be found in technical data sheets of optical waveguide transmission links. Furthermore, the clock rate of the binary signal must be set as an integral multiple of one time

5 interval, as a result of which the level of the disturbed binary signal does not change at an integral multiple of a time interval and thus within a time interval in the case of a time distortion (shortening or elongation of the Low or High level). This "time

10 segment", i.e. the level holding time within a time interval which indicates how long the level remains unchanged within a time interval, is weighted in such a manner that the level which is valid before or after the level change is set for restoring the binary signal

15 in this time interval. In this arrangement, it is provided to transfer the level detected within this time interval only if the level holding time reaches a predeterminable value.

In a practical exemplary embodiment of the

20 invention, the time intervals are fixed at in each case approx. 83.33 ns on the basis of the technical data of the components and the maximum permissible lengths of the optical waveguides. The clock rates of the binary signals to be transmitted via optical waveguides are an

25 integral multiple of this time interval, Baud rates of 12 MB, 3 MB, 1.5 MB and 500 KB are provided in the example. In the case where the data clock rate of the binary signal is transmitted at 500 KB, a signal data bit comprises 24 time intervals of in each case

30 83.33 ns in undisturbed operation.

In one embodiment of the invention, the type of distortion "elongated or shortened Low or High pulse", which can be determined in an identification mode of operation, is also taken into consideration for

35 weighting the level holding times, for restoring the binary signal in the time intervals in which level changes took place. The type of distortion is characteristic of an optical waveguide transmission link and

40

usually does not change abruptly but remains virtually constant. The identification mode of operation is set before the transmission of user data and, in this mode of operation, test data are transmitted which are

5 stored both in a transmitter and in a receiver. A comparison of the received test data with the test data stored in the receiver enables a conclusion to be drawn regarding the type of distortion.

In a further embodiment of the invention, after

10 each level change, the subsequent time intervals Z_i are synchronized which ensures that these time intervals remain constant during the period of restoration of the binary signal.

In the text which follows, the invention, its

15 embodiments and advantages will be explained in greater detail with reference to the drawing in which an exemplary embodiment of the invention is illustrated and in which

figures 1 and 2 show timing diagrams of a

20 disturbed binary signal and of a regenerated binary signal.

In figure 1, 1 designates a disturbed binary signal which is underdriven during the transmission via an optical transmission link provided with optical

25 waveguides and has shortened High levels 2 and elongated Low levels 3. For the weighting and evaluation of the disturbed binary signal, time intervals $Z_1, Z_2, \ldots Z_n$ having in each case a length of 83.33 ns are specified which in each case comprise

30 at least twice the distortion time of the optical transmission link. In the present example, the time intervals Z_i, $i = 1, 2, \ldots n$, are in each case subdivided into ten subintervals U_x, $x = 1, 2, \ldots 10$, which means that one subinterval U_x comprises 10% of

35 one time interval Z_i. For the sake of simplicity, the clock rate of the binary signal corresponds to the length

of the time interval in the present example, which corresponds to a Baud rate of 12 MB.

In the text which follows, it is assumed that, in order to restore the binary signal, a detected level
5   in the disturbed binary signal 1 in a time interval Z_i is only transferred for this time interval if the level holding time exceeds 30% in this time interval.

In the present example, a 0 level P_{01} of the disturbed binary signal 1 is present in the entire time
10   interval Z_1. The level holding time Ph_{11} of 30% of the time interval Z_1 is exceeded as a result of which this 0 level P_{01} for the time interval Z_1 is transferred for restoring a binary signal 4. In the time interval Z_2, a level change from a 0 level to a 1 level is detected,
15   where a level holding time Ph_{21} of the 0 level comprises 30% of the time interval Z_2 and a level holding time Ph_{22} of the 1 level comprises 70% of the time interval Z_2. A 1 level P_{12} is therefore transferred for the entire time interval Z_2. After a
20   further level change of the disturbed binary signal 1 at the beginning of the time interval Z_3 from a 1 level to a 0 level, this 0 level remains constant in time intervals Z_3 ... Z_7 and only changes again after a level holding time Ph_{81} which comprises 30% of the time
25   interval Z_8. A 0 level P_{03} ... P_{07} is therefore transferred for time intervals Z_3 ... Z_7 for restoring the binary signal 4 but a 1 level P_{18} is transferred for the entire time interval Z_8. This 1 level is also retained for the remaining time intervals and the
30   entire binary signal 4 is thus restored and the time distortions are eliminated.

In the text which follows, reference is made to figure 2 in which a disturbed binary signal 5 is shown which is overdriven during the transmission via an
35   optical waveguide and exhibits elongated High levels 6 and shortened Low levels 7. The parts which

are identical in the figures are provided with the same reference symbols.

In the text which follows, it is assumed again that, in order to restore a binary signal 8, a detected level in the disturbed binary signal 5 in a time interval Z_i is only transferred for this time interval if the level holding time exceeds 30% of the time interval. In the present case, this means that, in the entire time interval Z_1, the binary signal 8 to be restored is provided with a 0 level P_{01} since the disturbed binary signal 5 exhibits a 0 level for 70% of the time interval Z_1. In accordance with the manner described, a 1 level P_{11} is transferred in time interval Z_2, a 0 level P_{02} ... P_{07} is transferred in time intervals Z_3 ... Z_7 and a 1 level P_{18} ... P_{1n} is transferred in time interval Z_8 and the subsequent time intervals.

Patent claims

1.   A method for restoring a binary signal (4, 8),
which can be transmitted via an optical transmission
link, from a distorted binary signal (1, 5), the
optical transmission link exhibiting a distortion time,
characterized by the following method steps:
-       determining time intervals (Z1, Z2, ...) which in
        each case comprise at least twice the distortion
        time, the clock rate of the binary signal (4, 8)
        comprising an integral multiple of one time
        interval (Z1, Z2, ...),
-       detecting level changes of the distorted binary
        signal (1, 5) in the time intervals (Z1, Z2, ...),
-       determining level holding times (Ph11, Ph21, Ph22,
        ...) of the distorted binary signal (1, 5) which
        in each case indicate how long a level remains
        unchanged within a time interval (Z1, Z2, ...),
-       restoring the binary signal (4, 8) in the time
        intervals (Z1, Z2, ...)
        - by transferring the detected level in the time
           intervals (Z1, Z2, ...) in which no level
           changes have taken place in the distorted
           binary signal (1, 5), and
        - by transferring the detected level in the time
           intervals (Z1, Z2, ...) in which level changes
           have taken place, only when the respective
           level holding times (Ph11, Ph21, Ph22, ...)
           reach a predeterminable value.

2.   The method as claimed in claim 1, characterized
in that the type of distortion "elongated or shortened
Low or High pulse", which can be determined in an
identification mode of operation, is taken into
consideration for weighting the level holding times
(Ph11, Ph21, Ph22, ...), for restoring

the binary signal (4, 8) in the time intervals (Z1, Z2, ...) in which level changes took place.

3.   The method as claimed in claim 1 or 2, characterized in that, after each level change, the
5 subsequent time intervals (Z1, Z2, ...) are synchronized.

4.   A circuit arrangement for carrying out the method as claimed in claim 1, characterized by:

-   means for determining time intervals (Z1, Z2, ...)
10   which in each case comprise at least twice the distortion time, the clock rate of the binary signal (4, 8) comprising an integral multiple of one time interval (Z1, Z2, ...),

-   means for detecting level changes of the distorted
15   binary signal (1, 5) in the time intervals (Z1, Z2, ...),

-   means for determining level holding times (Ph11, Ph21, Ph22, ...) of the distorted binary signal (1, 5) which in each case indicate how long a
20   level remains unchanged within a time interval (Z1, Z2, ...),

-   means for restoring the binary signal (4, 8) in the time intervals (Z1, Z2, ...)
   - by transferring the detected level in the time
25   intervals (Z1, Z2, ...) in which no level changes have taken place in the distorted binary signal (1, 5), and
   - by transferring the detected level in the time intervals (Z1, Z2, ...) in which level changes
30   have taken place, only when the respective level holding times (Ph11, Ph21, Ph22, ...) reach a predeterminable value.

5.   The circuit arrangement as claimed in claim 4, characterized in that means are provided which take
35 into consideration

the type of distortion "elongated or shortened Low or High pulse", which is determined by the means in an identification mode of operation, for weighting the level holding times (Ph11, Ph21, Ph22, ...), for
5 restoring the binary signal (4, 8) in the time intervals (Z1, Z2, ...) in which level changes took place.

6.   The circuit arrangement as claimed in claim 4 or 5, characterized in that means are provided which,
10 after each level change, synchronize the subsequent time intervals (Z1, Z2, ...).

Abstract of the invention

Method and circuit arrangement for restoring a binary signal

Subscribers in optical data transmission systems usually receive binary signals with a time distortion due to attenuations within the transmission link. A method and a circuit arrangement for restoring a binary signal from a distorted binary signal are proposed, in which the Baud rate of the binary signal does not need to be known exactly to the receiving subscriber of the optical data transmission system.

The invention is applied in optical data transmission systems.
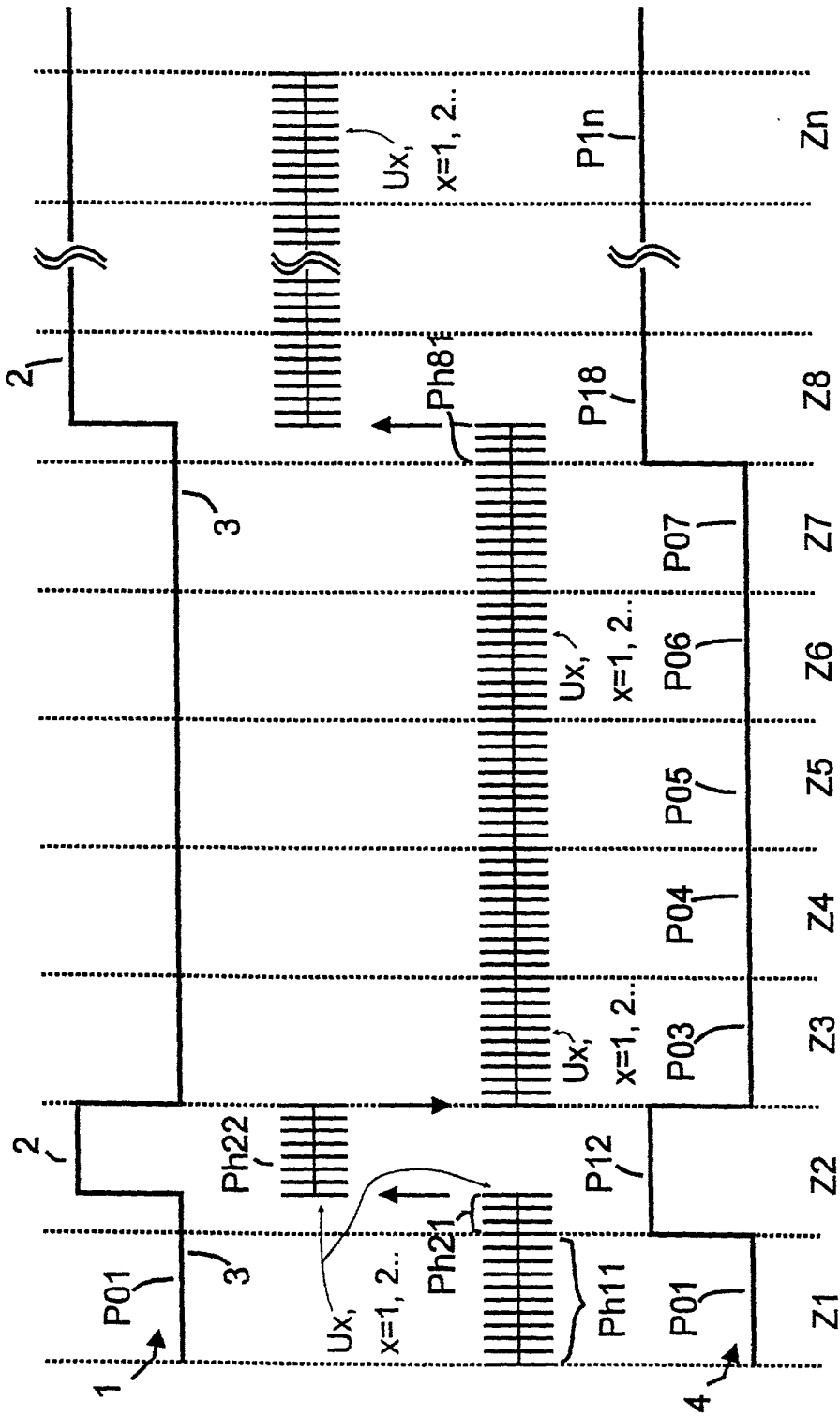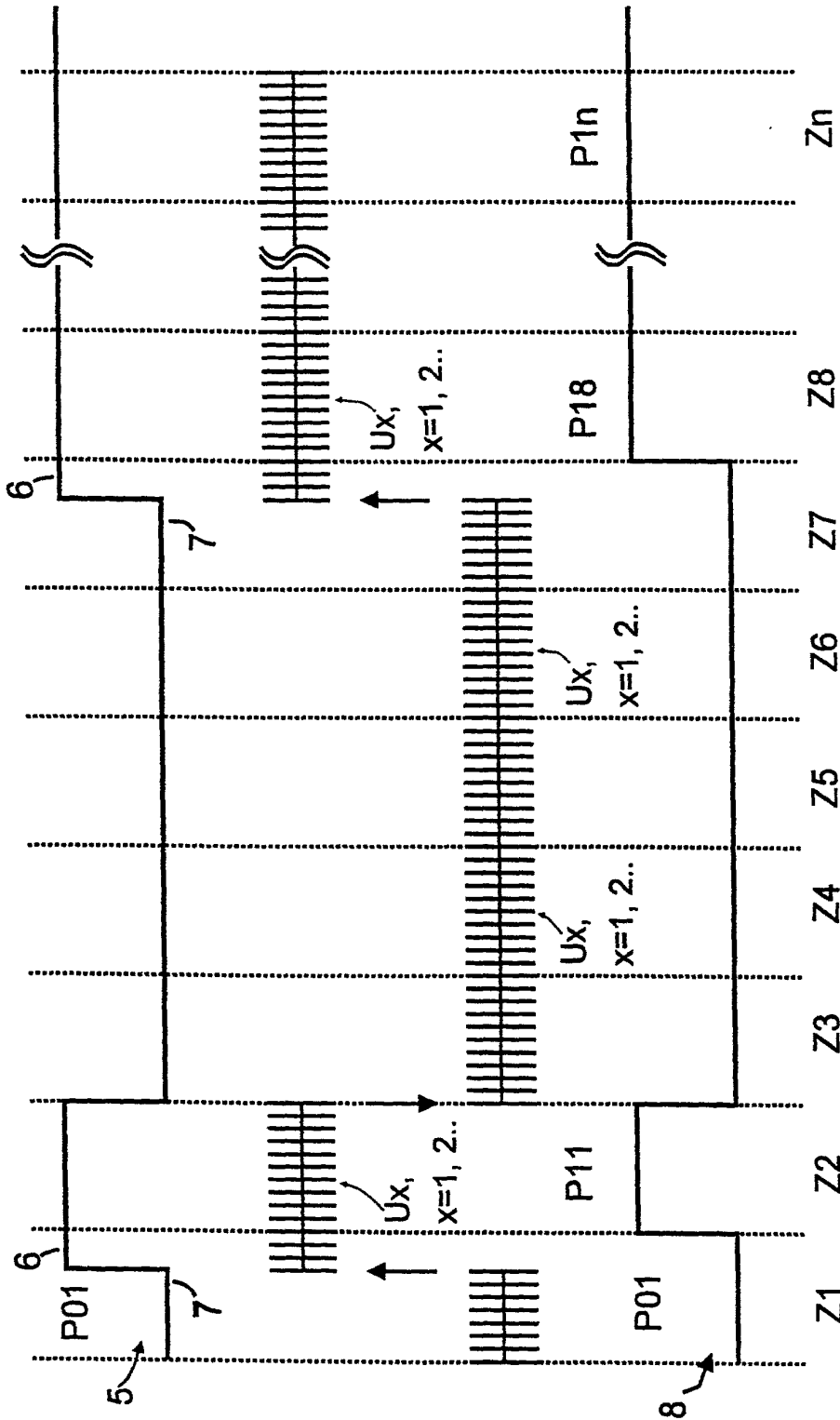
FIGURE 1

1/2

FIG 1

09701184

FIG 2

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel
:
VERFAHREN UND SCHALTUNGSANORDNUNG ZUM WIEDERHERSTELLEN EINES BINÄRSIGNALS

deren Beschreibung

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am _26. Mai 1999_ als
PCT internationale Anmeldung:
PCT Anmeldungsnummer:<u>PCT/DE99/01542</u>
eingereicht wurde und am
abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND CIRCUIT FOR RESTORING A BINARY SIGNAL

the specification of which

(check one)
☐ is attached hereto.
☐ was filed on _____ as
PCT international application
PCT Application No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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German Language Declaration

Prior foreign appplications
Priorität beansprucht

Priority Claimed

<u>198 23 705.7</u> <u>DE</u>

<u>27.05.1998</u>

☒   ☐

(Number)   (Country)
(Nummer)   (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Yes   No
Ja   Nein

_____

☐   ☐

(Number)   (Country)
(Nummer)   (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Yes   No
Ja   Nein

_____

☐   ☐

(Number)   (Country)
(Nummer)   (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Yes   No
Ja   Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

_____

(Application Serial No)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhangig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

_____

(Application Serial No)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgeben)

(Status)
(patented, pending,
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

Raymond C Stewart (Reg. No. 21,066); Terrell C. Birch (Reg. No. 19,382); Joseph A. Kolasch (Reg. No. 22,463); James M. Slattery (Reg. No. 28,380); Bernard L. Sweeney (Reg. No. 24,448); Michael K. Mutter (Reg. No. 29,680); Charles Gorenstein (Reg. No. 29,271); Gerald M. Murphy, Jr. (Reg. No. 28,977); Leonard R. Svensson (Reg. No. 30,330); Terry L. Clark (Reg. No. 32,644); Andrew D. Meikle (Reg. No. 32,868); Marc S. Weiner (Reg. No. 32,181); Joe McKinney Muncy (Reg. No. 32,334); Donald J. Daley (Reg. No. 34,313); John W. Bailey (Reg. No. 32,881); John A. Castellano (Reg. No. 35,094); and Gary D. Yacura (Reg. No. 35,416).

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Voller Name des einzigen oder ursprünglichen Erfinders:	Full name of sole or first inventor
JOHANNES BOZENHARDT	**JOHANNES BOZENHARDT**
Unterschrift des Erfinders · · · · · · · · · Datum	Inventor's signature · · · · · · · · · Date
[signature] 16. Nov. 2000	*[signature]* 16. Nov. 2000
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Voller Name des zweiten Miterfinders (falls zutreffend).	Full name of second joint inventor, if any·
Unterschrift des Erfinders · · · · · · · · · Datum	Second Inventor's signature · · · · · · · · · Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).   *(Supply similar information and signature for third and subsequent joint inventors).*

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